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09/729,195	12/05/2000	Hitoshi Ishikawa	Q62115	6703

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SUGHRUE, MION, ZINN, MACPEAK & SEAS  
2100 Pennsylvania Avenue, N.W.  
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EXAMINER
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YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 06/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/729,195

Applicant(s)  
Hitoshi ISHIKAWA et al.

Examiner  
M. Yamnitzky

Art Unit  
1774



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three (3) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1) ☒ Responsive to communication(s) filed on Apr 30, 2002

2b) ☐ This action is non-final.

2a) ☒ This action is FINAL.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

4) ☒ Claim(s) 1-25

is/are pending in the application.

4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) ☐ Claim(s) \_\_\_\_\_

is/are allowed.

6) ☒ Claim(s) 1-25

is/are rejected.

7) ☐ Claim(s) \_\_\_\_\_

is/are objected to.

8) ☐ Claims \_\_\_\_\_

are subject to restriction and/or election requirement.

## Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some\* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_

4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: \_\_\_\_\_

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1. This Office action is in response to applicants' amendment filed 04/30/02 which amends claims 1-5, 10, 11, 13, 14, 18, 19 and 21, and adds claims 22-25.

Claims 1-25 are pending.

2. Claims 10 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10, with claim 24 dependent therefrom: Proper antecedent basis is lacking for "said luminescent layer" as recited in line 4 of claim 10.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 stands rejected under 35 U.S.C. 102(b) as being anticipated by any one of JP 11-74079 or JP 11-185961 or JP 11-297473 for reasons of record in Paper No. 8.

5. Claims 1-4, 6, 10-16 and 18-21 stand rejected, and new claim 22 is rejected, under 35 U.S.C. 102(b) as being anticipated by JP 9-268284.

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(The page numbers referred to in this rejection are the page numbers found in the lower right corner of the translation pages. Note that the first page of the translation is page 2.)

See the whole document. In particular, see the abstract (pages 2-3), the compounds on pages 14-24, the description from the top of page 38 through the third line of page 39, and the device examples which begin on page 46.

Each of prior art compounds (1)-(24), (28), (33)-(38) and (44)-(52) meets the limitations of a compound of formula [1.1] as required by claim 1. Of these compounds, each of compounds (48)-(52) meets the additional limitation set forth in claim 2, and each of compounds (9) and (15) meets the additional limitation set forth in claim 22.

Each of prior art compounds (12), (13) and (17) meets the limitations of a compound of formula [2.1] as required by claims 3, 10, 11 and 13. Of these compounds, compound (13) meets the additional limitations set forth in claims 4 and 6.

Each of prior art compounds (48)-(52) meets the limitations of a compound of formula [3.1] as required by claims 14, 18, 19 and 21, and the additional limitations set forth in claims 15 and 16.

Giving claims 10, 11, 18 and 19 their broadest reasonable interpretation, the hole transporting layer of claims 10 and 18, and the electron transporting layer of claims 11 and 19, may also function as a luminescent layer. Based on this interpretation, the electroluminescent element of these claims is anticipated by the prior art.

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6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 5, 7-11, 17-19 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 9-268284 as applied to claims 1-4, 6, 10-16 and 18-22 above, and for the further reasons set forth below.

The prior art does not disclose a specific compound meeting the limitations of claim 5. However, such a compound is within the scope of the prior art and compound (13) is a position isomer of such a compound (compound (13) having an n-butyl substituent at the para-position instead of the ortho-position on each of two aryl groups that are not styryl groups).

The prior art also does not disclose any specific examples of compounds meeting the limitations of claims 7-9, 17 or 23-25, but such compounds are within the scope of the prior art. For example, the prior art teaches that  $R^4$ , which corresponds in position to  $R_6$  of the present claims, can be a substituted or unsubstituted alkyl group (e.g. see page 3). Exemplary alkyl groups are disclosed on page 12. The prior art also teaches that one or more of  $X^1$ - $X^4$  can be a substituted arylene group, and Z can be a substituted aryl group (page 3). As taught on page 13, the aryl group represented by Z can be substituted with an alkyl group such as the alkyl groups suitable for  $R^4$ . Various of the exemplary alkyl groups are saturated hydrocarbon groups having

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two or more carbon atoms. The aryl group represented by Z may also be substituted with an alkoxy group as taught on page 13. Although the prior art does not name possible substituents for the arylene group represented by X<sup>1</sup>-X<sup>4</sup>, one of ordinary skill in the art would reasonably expect that substituents suitable for the aryl group represented by Z would also be suitable for the arylene group represented by X<sup>1</sup>-X<sup>4</sup>.

Although the prior art does not disclose any specific examples of compounds meeting the limitations of claims 5, 7-9, 17 and 23-25, such compounds are within the scope of the prior art. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds within the scope of the generic formula disclosed by the prior art, to make compounds that are similar to the specific compounds disclosed in the prior art, and to use those compounds for the purpose taught by the prior art. One of ordinary skill in the art at the time of the invention would have been motivated to make other compounds within the scope of the prior art, and compounds similar to those disclosed by the prior art, with the expectation that compounds similar in structure will have similar properties and can be used for the purpose taught by the prior art. See *In re Payne*, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979). Also see *In re Wilder*, 563 F.2d 457, 195 USPQ 426 (CCPA 1977).

With respect to claims 10, 11, 18 and 19, if these claims were to be amended to explicitly require that the hole transporting layer or electron transporting layer comprising the specified compound be a layer distinct from a luminescent layer, it is the examiner's position that devices having such a structure/composition would have been obvious to one of ordinary skill in the art at

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the time of the invention given that the prior art teaches that the compounds have high positive hole transportability and electron transportability as well as having high luminous quantum efficiency. Based on the prior art teachings of the properties of the compounds, it would have been an obvious modification to one of ordinary skill in the art at the time of the invention to utilize the compounds in a hole transporting layer or an electron transporting layer of an electroluminescent device in addition to utilizing the compounds in the luminescent layer of the device. One of ordinary skill in the art would have been motivated to do so based on the prior art teachings that the compounds have properties that are desirable for these layers.

8. Applicants' arguments filed 04/30/02 have been fully considered but they are not persuasive with respect to the prior art rejections.

Applicants argue that their invention relates to compounds of structural formula [2.1] which contain at least one group of structural formula [2.2] and at least one saturated hydrocarbon group having two or more hydrocarbon groups in which oxygen atom(s) may be inserted, thereby causing steric hindrance and concentration quenching. Applicants further argue that their invention relates to compounds of structural formula [3.1] which contain at least one group of structural formula [3.2] and where  $R_6$  (part of formula [3.2]) is a substituent other than a hydrogen atom. Applicants argue that claims 1 and 2 are generic to both of these inventive concepts, and that these two characteristics are not taught or disclosed by the cited references.

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While claim 1 is generic for compounds of structural formula [2.1] and structural formula [3.1] containing the groups discussed above, claim 1 is generic for additional compounds which do not meet the limitations of structural formula [2.1] or [3.1] containing the groups discussed above. Thus, while the prior art formulae referenced by the examiner in the 102(b) rejection based on any one of JP '079, JP '961 or JP '473 as set forth in Paper No. 8 do not represent compounds of structural formula [2.1] or [3.1] containing the groups discussed above, the prior art formulae referenced by the examiner do meet the limitations of the generic compound required by claim 1. Claim 1 requires a compound of structural formula [1.1] which contains at least one group of structural formula [1.2] and at least one hydrocarbon group which may include oxygen atom(s). The prior art formulae referenced by the examiner with respect to JP '079, JP '961 and JP '473 meet these limitations. For example, the first formula shown on page 14 of JP '079 represents a compound of formula [1.1] wherein Ar<sub>1</sub> represents a naphthylene group, one of Ar<sub>2</sub> and Ar<sub>3</sub> represents a group of formula [1.2] while the other represents an aryl group having 6 to 20 carbon atoms, one of Ar<sub>4</sub> and Ar<sub>5</sub> represents a group of formula [1.2] while the other represents an aryl group having 6 to 20 carbon atoms, and each of the groups corresponding to Ar<sub>2</sub>, Ar<sub>3</sub>, Ar<sub>4</sub> and Ar<sub>5</sub> comprises at least one hydrocarbon group. In the first formula on page 14 of JP '079, each of the groups corresponding to Ar<sub>2</sub>, Ar<sub>3</sub>, Ar<sub>4</sub> and Ar<sub>5</sub> of present formula [1.1] is a hydrocarbon group as a whole. Each of these groups can also be broken up into different portions, each of which is a hydrocarbon group (e.g. the tolyl substituents attached directly to the



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nitrogens comprise a methyl group, which is a hydrocarbon group, and a phenylene group, which is a hydrocarbon group).

Similarly, while some of the prior art compounds referenced by the examiner with respect to JP '284 do not represent compounds of structural formula [2.1] or [3.1] containing the groups discussed above, and some of the referenced compounds do not meet the limitations of structural formula [1.1] as further limited by claims 2 and 22 (each of which depend from claim 1), all of the prior art compounds referenced by the examiner with respect to JP '284 do meet the limitations of the generic compound required by claim 1.

With respect to the rejection of claim 4 based on JP '284, applicants state that the examiner relies on prior art compounds (12), (13) and (17). Applicants argue that compounds (12) and (17) contain substituent groups containing nitrogen atoms, and the nitrogen containing substituent groups are not hydrocarbon groups, and further that the substituents on compound (17) do not appear to be saturated. The examiner points out that only prior art compound (13) was/is specifically relied upon with respect to claim 4. To the extent that applicants' arguments may be directed to the rejection of claim 3 and other claims requiring a compound of formula [2.1] of the same scope as defined in claim 3, claim 3 recites "at least one of Ar<sub>2</sub> to Ar<sub>5</sub> comprises at least one saturated hydrocarbon group having 2 or more carbon atoms in which oxygen atom(s) may be inserted" (emphasis added). Compound (12) of JP '284 is a compound of formula [2.1] as defined in claim 3 (and various other claims) wherein each of Ar<sub>2</sub> to Ar<sub>5</sub> comprises two ethyl groups (saturated hydrocarbon groups having 2 carbon atoms). Compound (13) of JP '284 is a

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compound of formula [2.1] as defined in claim 3 (and various other claims), and further defined in claim 4, wherein one of Ar<sub>2</sub> and Ar<sub>3</sub>, and one of Ar<sub>4</sub> and Ar<sub>5</sub>, comprises an n-butyl group (a saturated hydrocarbon group having 4 carbon atoms). Compound (17) of JP '284 is a compound of formula [2.1] as defined in claim 3 (and various other claims) wherein each of Ar<sub>2</sub> to Ar<sub>5</sub> comprises an ethyl group (a saturated hydrocarbon group having 2 carbon atoms).

With respect to applicants' arguments regarding compound (13) of JP '284 and present claim 5, the rejection of claim 5 was/is made under 35 U.S.C. 103(a) based on the *prima facie* obviousness of making compounds that are structurally similar to the prior art compounds with the expectation that structurally similar compounds would have similar properties and could be used for the purposes of the prior art. While applicants argue that the position of the saturated hydrocarbon group having two or more carbon atoms as required by claim 5 improves steric hindrance, applicants have pointed to no objective evidence of record, nor provided any objective evidence in the form of an affidavit or declaration, demonstrating that a compound similar to prior art compound (13) having at least one of the two n-butyl groups in an ortho position provides unexpectedly superior results compared to prior art compound (13) in which both of the n-butyl groups are in a para position.

The relevance of applicants' comments regarding compound (39) of JP '284 to the prior art rejections of record are not clear to the examiner. The examiner did not specifically reference prior art compound (39) in either the 102(b) or the 103(a) rejection based on JP '284.

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9. Applicants' amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (703) 308-4413. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax numbers for Art Unit 1774 are (703) 872-9311 for official after final faxes and (703) 872-9310 or (703) 305-5408 for all other official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (703) 872-9041.)

MRY  
06/20/02



MARIE YAMNITZKY  
PRIMARY EXAMINER

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